Claims

1. An assembly for accommodating rotation about an axis, said assembly comprising:

a first member;

a second member;

a bearing located between the first and second members and having an inner race fitted to the first member and provided with a raceway that is presented away from the axis, an outer race that is fitted to the second member and is provided with a raceway that is presented toward the axis and the raceway of the inner race, and rolling elements located between and contacting the raceways of the inner and outer races;

a seal for isolating the interior of the bearing from external contaminants and including a first wear ring, a second wear ring, a backing element urging one of the wear rings toward the other wear ring, at least one of the wear rings being carried by one of the races.

2. An assembly according to claim 1 wherein the outer race carries an extension that projects axially beyond the raceway of the outer race and the first wear ring is carried by the extension.

3. An assembly according to claim 2 wherein the extension is formed integral with the outer race.

4. An assembly according to claim 2 wherein the extension is welded to the outer race.

5. An assembly according to claim 2 wherein the second wear ring is carried by the first member.

6. An assembly according to claim 2 and further comprising a can attached to the inner race, and the second wear ring is carried by the can.

7. An assembly according to claim 6 wherein the inner race has a rib that projects outwardly beyond the raceway for the inner race, and the can is mounted on and attached to the rib.

8. An assembly according to claim 2 wherein the extension on the outer race has a tapered surface; wherein the first wear ring has a tapered rear surface that is presented toward the tapered surface on the extension; and wherein the backing element is an elastomeric O-ring that is between and bears against the tapered surface and tapered rear surface.

9. An assembly according to claim 8 wherein the first member has a tapered surface; wherein the second wear ring has a tapered rear surface which is presented toward the tapered surface on the first member; and wherein the seal further comprises another elastomeric O-ring located between the tapered rear surface on the second wear ring and the tapered surface on the first member.

10. An assembly according to claim 8 and further comprising a can attached to the inner race, the can having a tapered surface that is presented generally toward the axis; wherein the second wear ring has a tapered rear surface that is presented toward the tapered surface on the can; and wherein another O-ring is located between and contacts the tapered surface on the can and the tapered rear surface on the second wear ring.

11. An assembly according to claim 2 wherein the wear rings are large enough to pass over the rolling elements.

12. An assembly according to claim 1 wherein the backing element is formed from a polymer and includes a base, a floating segment spaced from the base and attached to the wear ring, and a connecting segment extending between and connected to the base and floating segment, the connecting segment including at least one convolution located at an oblique angle with respect to the axis.

13. An assembly according to claim 1 wherein each wear ring is urged toward the other wear ring by a backing element, with each backing element including a base attached to a supporting structure, a floating segment spaced from the base and attached to the wear ring for the backing element, and a connecting segment located between and

connected to the base and floating segment, the connecting segment including at least one convolution located at an oblique angle to the axis.

14. An assembly according to claim 13 wherein the base of the backing element for the first wear ring is attached to an extension that projects from the outer race axially beyond the raceway for the outer race; and wherein the base of the backing element for the second wear ring is attached to the first member.

15. An assembly according to claim 13 wherein the base of the backing element for the first wear ring is attached to an extension that projects from the outer race axially beyond the raceway for the outer race; and wherein the base of the backing element for the second wear ring is attached to a can which is attached to the inner race and projects radially.

16. An assembly according to claim 2 and further comprising a can attached to the inner race and extending outwardly; and wherein the seal further comprises a flexible membrane located between the can and the second wear ring, and a biasing element to urge the second wear ring toward and against the first wear ring.

17. An assembly according to claim 8 wherein the can has a lip oriented at an angle to the axis and positioned for engagement by a tool for pulling the can and inner race from the first member.

18. A bearing assembly for facilitating rotation about an axis, said bearing assembly comprising: an inner race having a raceway that is presented outwardly away from the axis;

an outer race having a raceway that is presented inwardly toward the axis and toward the raceway on the inner race, rolling elements located between and contacting inner and outer raceways;

an extension joined to the outer race and projecting axially beyond the raceway of the outer race;

a first wear ring having a wear surface located at an angle with respect to the axis;

a first backing element supporting the first wear ring on the extension and urging the first wear ring away from the extension;

a second wear ring having a wear surface located at a steep angle with respect to the axis and contacting the wear surface of the first wear ring;

a second backing element supporting the second wear ring;

the two wear rings being biased toward each other.

19. A bearing assembly according to claim 18 wherein each backing element biases the wear ring that it supports toward the other wear ring.

20. A bearing assembly according to claim 18 wherein the extension has a tapered surface that is presented generally inwardly toward the axis; wherein the first wear ring has a tapered rear surface that is presented toward the tapered surface on the extension; and wherein the first backing element is an elastomeric O-ring that is located between the tapered surface of the extension and the tapered rear surface on the first wear ring.

21. A bearing assembly according to claim 18 and further comprising a can mounted on the inner race and extending outwardly away from the axis; and wherein the second backing element is located between the can and the second wear ring.

22. A bearing according to claim 21 wherein the backing element for each wear ring includes a base, a floating segment attached to the wear ring, and a connecting segment that extends between the base and the floating segment at an angle oblique to the axis; and wherein the base of the first backing element is attached to the extension.

23. A bearing assembly according to claim 22 and further comprising a can mounted on the inner race and extending outwardly away from the axis; and wherein the base of the second backing element is attached to the can.

24. A bearing assembly according to claim 21 wherein the second backing element is a membrane located between the second wear ring and the can.

25. A bearing assembly according to claim 24 and further comprising at least one spring located between the can and the second wear ring and biasing the second wear ring toward the first wear ring.

26. A seal for establishing a fluid barrier around an axis of rotation, said seal comprising:

a first wear ring having a wear surface that lies at an angle with respect to the axis;

a second wear ring located adjacent to the first wear ring and having a wear surface that is against the wear surface of the first wear ring;

a first backing element for urging the first wear ring toward the second wear ring, the first backing element being formed from a polymer and including, a base located remote from the first wear ring, a floating segment attached to the first wear ring, and a resilient connecting segment extending between and attached to the base and floating segments;

a second backing element for urging the second wear ring toward the first wear ring, the second backing element being formed from a polymer and including a base located remote from the second wear ring, a floating segment attached to the second wear ring, and a resilient connecting segment extending between and attached to the base and floating element.

27. A seal according to claim 26 wherein the wear surfaces on the wear rings are oriented perpendicular to the axis, at least one of the rings having a chamfer that opens toward the axis and leads to the contacting wear surfaces.

28. A seal according to claim 26 wherein the connecting segments of the backing elements extend obliquely with respect to the axis.

29. A seal according to claim 26 wherein the base for at least one of the backing elements is wedge-shaped.